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By
Albert E. Salo

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AEC, Oak Ridge, Tenn.

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By Albert E. Salo

It is difficult or impossible to remove radioactive contamination from ordinary concrete surfaces. A penetrating application of paraffin, however, seals the pores of the surface and makes decontamination relatively easy because it reduces absorption of liquids that might carry radioactivity. Molten paraffin (mp 125°F) is applied to a clean concrete surface that has been heated to about 500°F. Penetration depths of $\frac{1}{4}$ inch are usual, but penetration may range up to $\frac{3}{4}$ inch. Pore spaces in the concrete are sealed when the paraffin cools.

The concrete surface is prepared by acid etching and wire brushing. A thorough rinse with running water is followed by a drying period of at least four days. Batteries of infrared lamps may be used to help the drying process.

In melting the paraffin, provisions should be made to conduct fumes away and to extinguish any flash flames. Probability of flashing can be reduced if an electric hotplate is used in preference to an open flame, and if the liquid temperature is kept below 200°F.

A wide-tip oxyacetylene torch is used to heat the concrete. Great care must be taken in applying the flame slowly and evenly. Areas of 5 to 10 square feet are heated at one time. The torch operator should be protected against the possibility of spalling particles by wearing a face shield and heavy clothing. Molten paraffin is brushed on the heated section until no more absorption takes place. Paraffin requirement is approximately 0.1 pound per square foot.

A layer of paraffin more than a few mils thick on the surface is both unnecessary and undesirable. Protection against possible radioactive contamination is provided by the paraffin that is absorbed into the concrete, not that which remains on the surface. An excess on the surface makes floors slippery and dangerous.

Depth of penetration can be checked by the use of concrete test blocks, similar in texture and mix to the surface to be treated. After treatment the test block may be fractured with a hammer and chisel. The penetration line will usually be clearly discernible. Fig. 1 shows a typical cross section of a treated and fractured test block. The dark band at the top of the piece indicates how far the paraffin has penetrated into the block from application at the top. The band is wider at the left because in this area penetration also took place through the side surface. The dark spot on the right of the face and slightly below the surface penetration line indicates where a small amount of paraffin penetrated through a fissure into the underlying body of concrete.

Fig. 2 shows a stairway that has been treated with paraffin in the manner described. This work was done under the auspices of the U. S. Atomic Energy Commission.

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Fig. 1 — Treating concrete with paraffin.

Fig. 2 — Treating concrete with paraffin.

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